

003300-723.ST25

## SEQUENCE LISTING

<110> Hanson, Lars A.  
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Mattsbj-Baltzer, Inger  
Dolphin, Gunnar T.

<120> Peptides Based on the Sequence of Human Lactoferrin  
and Their Use

<130> 003300-723

<140> US 09/743,107  
<141> 2001-08-21

<150> PCT/SE99/01230  
<151> 2000-09-29

<150> SE 9802441-7  
<151> 1998-07-06

<150> SE 9802562-0  
<151> 1998-07-17

<150> SE 9804614-7  
<151> 1998-12-29

<160> 102

<170> PatentIn version 2.1

<210> 1  
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<221> MOD\_RES  
<222> (1)  
<223> ACETYLATION

<220>  
<221> PEPTIDE  
<222> (1)  
<223> Amino acid 1 is Xaa wherein Xaa = Glu or no amino acid.

<220>  
<221> PEPTIDE  
<222> (2)  
<223> Amino acid 2 is Xaa wherein Xaa = Ala or no amino acid.

<220>  
<221> PEPTIDE  
<222> (5)  
<223> Amino acid 5 is Xaa wherein Xaa = Cys or Ala.

<220>  
<221> PEPTIDE  
<222> (7)

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<223> Amino acid 7 is Xaa wherein Xaa = Gln or Lys.

<220>

<221> PEPTIDE

<222> (11)

<223> Amino acid 11 is Xaa wherein Xaa = Asn or Asp.

<220>

<221> PEPTIDE

<222> (17)..(25)

<223> Amino acids 17-25 are Xaa wherein Xaa = Gly, Pro, Pro, Val, Ser, Cys, Ile, Lys, Arg

<220>

<221> MOD\_RES

<222> (25)

<223> AMIDATION

<220>

<223> Description of Artificial Sequence: of natural or artificial origin, corresponding to modification of the sequence consisting of aa 16-40 in human lactoferrin

<400> 1

Xaa	Xaa	Thr	Lys	Xaa	Phe	Xaa	Trp	Gln	Arg	Xaa	Met	Arg	Lys	Val	Arg
1				5				10						15	

Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
			20					25

<210> 2

<211> 25

<212> PRT

<213> Artificial Sequence

<220>

<221> MOD\_RES

<222> (1)

<223> ACETYLTATION

<220>

<221> MOD\_RES

<222> (25)

<223> AMIDATION

<220>

<223> Description of Artificial Sequence: of natural or artificial origin, corresponding to a modification of the sequence consisting of amino acids 16-40 in human lactoferrin

<400> 2

Glu	Ala	Thr	Lys	Cys	Phe	Gln	Trp	Gln	Arg	Asn	Met	Arg	Lys	Val	Arg
1				5				10						15	

Gly	Pro	Pro	Val	Ser	Cys	Ile	Lys	Arg
			20					25

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<210> 3  
<211> 25  
<212> PRT  
<213> Artificial Sequence

<220>  
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<222> (1)  
<223> ACETYLTATION

<220>  
<221> MOD\_RES  
<222> (25)  
<223> AMIDATION

<220>  
<221> DISULFID  
<222> (5)..(22)

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin; corresponding to a modification  
of the sequence consisting of amino acids 16-40 in  
human lactoferrin

<400> 3  
Glu Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10 15

Gly Pro Pro Val Ser Cys Ile Lys Arg  
20 25

<210> 4  
<211> 23  
<212> PRT  
<213> Artificial Sequence

<220>  
<221> MOD\_RES  
<222> (1)  
<223> ACETYLTATION

<220>  
<221> MOD\_RES  
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<223> AMIDATION

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to a modification  
of the sequence consisting of amino acids 18-40 in  
human lactoferrin

<400> 4  
Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg Gly Pro  
1 5 10 15

Pro Val Ser Cys Ile Lys Arg

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20

<210> 5  
<211> 23  
<212> PRT  
<213> Artificial Sequence

<220>  
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<220>  
<221> MOD\_RES  
<222> (23)  
<223> AMIDATION

<220>  
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<222> (3)..(20)

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to a modification  
of the sequence consisting of amino acids 18-40 in  
human lactoferrin

<400> 5  
Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg Gly Pro  
1 5 10 15  
Pro Val Ser Cys Ile Lys Arg  
20

<210> 6  
<211> 14  
<212> PRT  
<213> Artificial Sequence

<220>  
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<223> ACETYLATION

<220>  
<221> MOD\_RES  
<222> (14)  
<223> AMIDATION

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to a modification  
of the sequence consisting of amino acids 18-31 in  
human lactoferrin

<400> 6

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Thr Lys Ala Phe Lys Trp Gln Arg Asp Met Arg Lys Val Arg  
 1 5 10

<210> 7  
 <211> 14  
 <212> PRT  
 <213> Artificial Sequence

<220>  
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 <222> (1)  
 <223> ACETYLTATION

<220>  
 <221> MOD\_RES  
 <222> (14)  
 <223> AMIDATION

<220>  
 <221> BINDING  
 <222> (5)..(9)  
 <223> LACTAM

<220>  
 <223> Description of Artificial Sequence: of natural or  
 artificial origin, corresponding to a modification  
 of the sequence consisting of aa 18-31 in human  
 lactoferrin; a lactam is formed between aa 5 and 9

<400> 7  
 Thr Lys Ala Phe Lys Trp Gln Arg Asp Met Arg Lys Val Arg  
 1 5 10

<210> 8  
 <211> 20  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Peptide of  
 natural or artificial origin consisting of the  
 amino acids in positions 12-31 of the protein  
 human lactoferrin

<400> 8  
 Val Ser Gln Pro Glu Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met  
 1 5 10 15

Arg Lys Val Arg  
 20

<210> 9  
 <211> 7  
 <212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 12-18 of the protein human lactoferrin

<400> 9

Val Ser Gln Pro Glu Ala Thr  
1 5

<210> 10

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 13-19 of the protein human lactoferrin

<400> 10

Ser Gln Pro Glu Ala Thr Lys  
1 5

<210> 11

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 14-20 of the protein human lactoferrin

<400> 11

Gln Pro Glu Ala Thr Lys Cys  
1 5

<210> 12

<211> 7

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 15-21 of the protein human lactoferrin

<400> 12

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Pro Glu Ala Thr Lys Cys Phe  
1 5

<210> 13  
<211> 7  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of  
natural or artificial origin consisting of the  
amino acids in positions 16-22 of the protein  
human lactoferrin

<400> 13  
Glu Ala Thr Lys Cys Phe Gln  
1 5

<210> 14  
<211> 7  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of  
natural or artificial origin consisting of the  
amino acids in positions 17-23 of the protein  
human lactoferrin

<400> 14  
Ala Thr Lys Cys Phe Gln Trp  
1 5

<210> 15  
<211> 7  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of  
natural or artificial origin consisting of the  
amino acids in positions 18-24 of the protein  
human lactoferrin

<400> 15  
Thr Lys Cys Phe Gln Trp Gln  
1 5

<210> 16  
<211> 7  
<212> PRT  
<213> Artificial Sequence

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&lt;220&gt;

<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 19-25 of the protein human lactoferrin

&lt;400&gt; 16

Lys Cys Phe Gln Trp Gln Arg  
1 5

&lt;210&gt; 17

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 20-26 of the protein human lactoferrin

&lt;400&gt; 17

Cys Phe Gln Trp Gln Arg Asn  
1 5

&lt;210&gt; 18

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 21-27 of the protein human lactoferrin

&lt;400&gt; 18

Phe Gln Trp Gln Arg Asn Met  
1 5

&lt;210&gt; 19

&lt;211&gt; 7

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 22-28 of the protein human lactoferrin

&lt;400&gt; 19

Gln Trp Gln Arg Asn Met Arg  
1 5



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<210> 20  
<211> 7  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of  
natural or artificial origin consisting of the  
amino acids in positions 23-29 of the protein  
human lactoferrin

<400> 20  
Trp Gln Arg Asn Met Arg Lys  
1 5

<210> 21  
<211> 7  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of  
natural or artificial origin consisting of the  
amino acids in positions 24-30 of the protein  
human lactoferrin

<400> 21  
Gln Arg Asn Met Arg Lys Val  
1 5

<210> 22  
<211> 7  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of  
natural or artificial origin consisting of the  
amino acids in positions 25-31 of the protein  
human lactoferrin

<400> 22  
Arg Asn Met Arg Lys Val Arg  
1 5

<210> 23  
<211> 8  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of

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natural or artificial origin consisting of the  
amino acids in positions 16-23 of the protein  
human lactoferrin

&lt;400&gt; 23

Glu Ala Thr Lys Cys Phe Gln Trp  
1 5

&lt;210&gt; 24

&lt;211&gt; 9

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Peptide of  
natural or artificial origin consisting of the  
amino acids in positions 16-24 of the protein  
human lactoferrin

&lt;400&gt; 24

Glu Ala Thr Lys Cys Phe Gln Trp Gln  
1 5

&lt;210&gt; 25

&lt;211&gt; 10

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Peptide of  
natural or artificial origin consisting of the  
amino acids in positions 16-25 of the protein  
human lactoferrin

&lt;400&gt; 25

Glu Ala Thr Lys Cys Phe Gln Trp Gln Arg  
1 5 10

&lt;210&gt; 26

&lt;211&gt; 11

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: Peptide of  
natural or artificial origin consisting of the  
amino acids in positions 16-26 of the protein  
human lactoferrin

&lt;400&gt; 26

Glu Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn  
1 5 10

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<210> 27  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 16-27 of the protein human lactoferrin

<400> 27  
Glu Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met  
1 5 10

<210> 28  
<211> 13  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 16-28 of the protein human lactoferrin

<400> 28  
Glu Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg  
1 5 10

<210> 29  
<211> 14  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 16-29 of the protein human lactoferrin

<400> 29  
Glu Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys  
1 5 10

<210> 30  
<211> 15  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 16-30 of the protein

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## human lactoferrin

&lt;400&gt; 30

Glu	Ala	Thr	Lys	Cys	Phe	Gln	Trp	Gln	Arg	Asn	Met	Arg	Lys	Val
1				5				10						15

&lt;210&gt; 31

&lt;211&gt; 16

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 16-31 of the protein human lactoferrin

&lt;400&gt; 31

Glu	Ala	Thr	Lys	Cys	Phe	Gln	Trp	Gln	Arg	Asn	Met	Arg	Lys	Val	Arg
1				5				10						15	

&lt;210&gt; 32

&lt;211&gt; 19

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 13-31 of the protein human lactoferrin

&lt;400&gt; 32

Ser	Gln	Pro	Glu	Ala	Thr	Lys	Cys	Phe	Gln	Trp	Gln	Arg	Asn	Met	Arg
1				5				10						15	

Lys Val Arg

&lt;210&gt; 33

&lt;211&gt; 18

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 14-31 of the protein human lactoferrin

&lt;400&gt; 33

Gln	Pro	Glu	Ala	Thr	Lys	Cys	Phe	Gln	Trp	Gln	Arg	Asn	Met	Arg	Lys
1				5				10						15	

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Val Arg

<210> 34  
<211> 17  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of  
natural or artificial origin consisting of the  
amino acids in positions 15-31 of the protein  
human lactoferrin

<400> 34  
Pro Glu Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val  
1 5 10 15

Arg

<210> 35  
<211> 15  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of  
natural or artificial origin consisting of the  
amino acids in positions 17-31 of the protein  
human lactoferrin!

<400> 35  
Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10 15

<210> 36  
<211> 14  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of  
natural or artificial origin consisting of the  
amino acids in positions 18-31 of the protein  
human lactoferrin

<400> 36  
Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

&lt;210&gt; 37

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<211> 13  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 19-31 of the protein human lactoferrin

<400> 37  
Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 38  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 20-31 of the protein human lactoferrin

<400> 38  
Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 39  
<211> 11  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 21-31 of the protein human lactoferrin

<400> 39  
Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 40  
<211> 10  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of natural or artificial origin consisting of the amino acids in positions 22-31 of the protein human lactoferrin

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<400> 40  
Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 41  
<211> 9  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of  
natural or artificial origin consisting of the  
amino acids in positions 23-31 of the protein  
human lactoferrin

<400> 41  
Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5

<210> 42  
<211> 8  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Peptide of  
natural or artificial origin consisting of the  
amino acids in positions 24-31 of the protein  
human lactoferrin

<400> 42  
Gln Arg Asn Met Arg Lys Val Arg  
1 5

<210> 43  
<211> 11  
<212> PRT  
<213> Artificial Sequence

<220>  
<221> PEPTIDE  
<222> (2)..(10)  
<223> Amino acids 2, 4, 6 and 10 are Xaa wherein Xaa = Gln, Lys,  
Asp, Asn or Val.

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to a modification  
of the sequence consisting of amino acids 21-31 in  
human lactoferrin

<400> 43  
Phe Xaa Trp Xaa Arg Xaa Met Arg Lys Xaa Arg  
1 5 10

<210> 44  
<211> 11  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of amino acids 21-31 in human  
lactoferrin

<400> 44  
Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 45  
<211> 11  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 21-31 in human lactoferrin  
wherein one aa has been substituted

<400> 45  
Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 46  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 46  
Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 47  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<221> MOD\_RES



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<222> (1)  
<223> ACETYLATION

<220>  
<221> MOD\_RES  
<222> (12)  
<223> AMIDATION

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin

<400> 47  
Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 48  
<211> 13  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 19-31 in human lactoferrin

<400> 48  
Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 49  
<211> 13  
<212> PRT  
<213> Artificial Sequence

<220>  
<221> MOD\_RES  
<222> (1)  
<223> ACETYLATION

<220>  
<221> MOD\_RES  
<222> (13)  
<223> AMIDATION

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 19-31 in human lactoferrin  
wherein one aa has been modified

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&lt;400&gt; 49

Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

&lt;210&gt; 50

&lt;211&gt; 14

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 18-31 in human lactoferrin

&lt;400&gt; 50

Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

&lt;210&gt; 51

&lt;211&gt; 14

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (1)

&lt;223&gt; ACETYLTATION

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (14)

&lt;223&gt; AMIDATION

&lt;220&gt;

<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 18-31 in human lactoferrin

&lt;400&gt; 51

Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

&lt;210&gt; 52

&lt;211&gt; 14

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to a modification  
of the sequence consisting of amino acids 18-31 in

## human lactoferrin

&lt;400&gt; 52

Thr Lys Ala Phe Lys Trp Gln Arg Asp Met Arg Lys Val Arg  
1 5 10

&lt;210&gt; 53

&lt;211&gt; 14

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to a modification  
of the sequence consisting of amino acids 18-31 in  
human lactoferrin

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (1)

&lt;223&gt; ACETYLTATION

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (14)

&lt;223&gt; AMIDATION

&lt;400&gt; 53

Thr Lys Ala Phe Lys Trp Gln Arg Glu Met Arg Lys Val Arg  
1 5 10

&lt;210&gt; 54

&lt;211&gt; 14

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to a modification  
of the sequence consisting of aa 18-31 in human  
lactoferrin; a lactam is formed between aa 5 and 9

&lt;220&gt;

&lt;221&gt; BINDING

&lt;222&gt; (5)..(9)

&lt;223&gt; LACTAM

&lt;400&gt; 54

Thr Lys Ala Phe Lys Trp Gln Arg Asp Met Arg Lys Val Arg  
1 5 10

&lt;210&gt; 55

&lt;211&gt; 14

&lt;212&gt; PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: of natural or artificial origin, corresponding to a modification of the sequence consisting of aa 18-31 in human lactoferrin; a lactam is formed between aa 5 and 9

<220>

<221> MOD\_RES

<222> (1)

<223> ACETYLTATION

<220>

<221> MOD\_RES

<222> (14)

<223> AMIDATION

<220>

<221> BINDING

<222> (5)..(9)

<223> LACTAM

<400> 55

Thr Lys Ala Phe Lys Trp Gln Arg Glu Met Arg Lys Val Arg  
1 5 10

<210> 56

<211> 14

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: of natural or artificial origin, corresponding to a modification of the sequence consisting of amino acids 18-31 in human lactoferrin

<400> 56

Thr Lys Lys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 57

<211> 14

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: of natural or artificial origin, corresponding to a modification of the sequence consisting of amino acids 18-31 in human lactoferrin

<220>

<221> MOD\_RES

<222> (1)

## &lt;223&gt; ACETYLTATION

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (14)

&lt;223&gt; AMIDATION

&lt;400&gt; 57

Thr Lys Lys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

&lt;210&gt; 58

&lt;211&gt; 14

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: of natural or artificial origin, corresponding to a modification of the sequence consisting of amino acids 18-31 in human lactoferrin

&lt;400&gt; 58

Thr Lys Lys Phe Gln Trp Asp Arg Lys Met Arg Lys Asp Arg  
1 5 10

&lt;210&gt; 59

&lt;211&gt; 14

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: of natural or artificial origin, corresponding to a modification of the sequence consisting of amino acids 18-31 in human lactoferrin

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (1)

&lt;223&gt; ACETYLTATION

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (14)

&lt;223&gt; AMIDATION

&lt;400&gt; 59

Thr Lys Lys Phe Gln Trp Asp Arg Lys Met Arg Lys Asp Arg  
1 5 10

&lt;210&gt; 60

&lt;211&gt; 14

&lt;212&gt; PRT

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## &lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: of natural or artificial origin, corresp. to a modification of the seq. consisting of aa 18-31 in human lactoferrin; lactams formed between aa 3 and 7, and 9 and 13

&lt;220&gt;

&lt;221&gt; BINDING

&lt;222&gt; (3)..(7)

&lt;223&gt; LACTAM

&lt;220&gt;

&lt;221&gt; BINDING

&lt;222&gt; (9)..(13)

&lt;223&gt; LACTAM

&lt;400&gt; 60

Thr Lys Lys Phe Gln Trp Asp Arg Lys Met Arg Lys Asp Arg  
1 5 10

&lt;210&gt; 61

&lt;211&gt; 14

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: of natural or artificial origin, corresp. to a modification of the seq. consisting of aa 18-31 in human lactoferrin; lactams formed between aa 3 and 7, and 9 and 13

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (1)

&lt;223&gt; ACETYLATION

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (14)

&lt;223&gt; AMIDATION

&lt;220&gt;

&lt;221&gt; BINDING

&lt;222&gt; (3)..(7)

&lt;223&gt; LACTAM

&lt;220&gt;

&lt;221&gt; BINDING

&lt;222&gt; (9)..(13)

&lt;223&gt; LACTAM

&lt;400&gt; 61

Thr Lys Lys Phe Gln Trp Asp Arg Lys Met Arg Lys Asp Arg  
1 5 10

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<210> 62  
<211> 15  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of amino acids 17-31 in human  
lactoferrin

<400> 62  
Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10 15

<210> 63  
<211> 15  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to a modification  
of the sequence consisting of amino acids 17-31 in  
human lactoferrin

<220>  
<221> MOD\_RES  
<222> (1)  
<223> ACETYLATION

<220>  
<221> MOD\_RES  
<222> (15)  
<223> AMIDATION

<400> 63  
Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10 15

<210> 64  
<211> 16  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of amino acids 16-31 in human  
lactoferrin

<400> 64  
Glu Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10 15

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<210> 65  
<211> 16  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or artificial origin, corresponding to a modification of the sequence consisting of amino acids 16-31 in human lactoferrin

<220>  
<221> MOD\_RES  
<222> (1)  
<223> ACETYLATION

<220>  
<221> MOD\_RES  
<222> (16)  
<223> AMIDATION

<400> 65  
Glu Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10 15

<210> 66  
<211> 17  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or artificial origin, corresponding to the sequence consisting of amino acids 15-31 in human lactoferrin

<400> 66  
Pro Glu Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val  
1 5 10 15

Arg

<210> 67  
<211> 17  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or artificial origin, corresponding to a modification of the sequence consisting of amino acids 15-31 in human lactoferrin

<220>  
<221> MOD\_RES



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<222> (1)  
<223> ACETYLATION

<220>  
<221> MOD RES  
<222> (17)  
<223> AMIDATION

<400> 67  
Pro Glu Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val  
1 5 10 15

Arg

<210> 68  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 68  
Ala Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 69  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 69  
Cys Ala Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 70  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin

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wherein one aa has been substituted

<400> 70  
Cys Phe Ala Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 71  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 71  
Cys Phe Gln Ala Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 72  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 72  
Cys Phe Gln Trp Ala Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 73  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been modified

<400> 73  
Cys Phe Gln Trp Gln Ala Asn Met Arg Lys Val Arg  
1 5 10

<210> 74

<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 74  
Cys Phe Gln Trp Gln Arg Ala Met Arg Lys Val Arg  
1 5 10

<210> 75  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 75  
Cys Phe Gln Trp Gln Arg Asn Ala Arg Lys Val Arg  
1 5 10

<210> 76  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 76  
Cys Phe Gln Trp Gln Arg Asn Met Ala Lys Val Arg  
1 5 10

<210> 77  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 77  
Cys Phe Gln Trp Gln Arg Asn Met Arg Ala Val Arg  
1 5 10

<210> 78  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 78  
Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Ala Arg  
1 5 10

<210> 79  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 79  
Cys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Ala  
1 5 10

<210> 80  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 80  
Cys Phe Gln Leu Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 81  
<211> 12  
<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: of natural or artificial origin, corresponding to the sequence consisting of aa 20-31 in human lactoferrin wherein one aa has been substituted

<400> 81

Cys Phe Gln Trp Gln Lys Asn Met Arg Lys Val Arg  
1 5 10

<210> 82

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: of natural or artificial origin, corresponding to the sequence consisting of aa 20-31 in human lactoferrin wherein one aa has been substituted

<400> 82

Cys Phe Gln Trp Gln Arg Asn Leu Arg Lys Val Arg  
1 5 10

<210> 83

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: of natural or artificial origin, corresponding to the sequence consisting of aa 20-31 in human lactoferrin wherein one aa has been substituted

<400> 83

Cys Phe Gln Trp Gln Arg Asn Met Lys Lys Val Arg  
1 5 10

<210> 84

<211> 12

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: of natural or artificial origin, corresponding to the sequence consisting of aa 20-31 in human lactoferrin wherein one aa has been substituted

<400> 84

Cys Phe Gln Trp Glu Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 85  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 85  
Cys Phe Gln Trp Gln Glu Asn Met Arg Lys Val Arg  
1 5 10

<210> 86  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 86  
Cys Phe Gln Trp Gln Arg Glu Met Arg Lys Val Arg  
1 5 10

<210> 87  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<220>  
<221> MISC\_FEATURE  
<222> (5)  
<223> Amino acid 5 is Xaa wherein Xaa = Orn.

<400> 87  
Cys Phe Gln Trp Xaa Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 88  
<211> 12  
<212> PRT  
<213> Artificial Sequence  
  
<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<220>  
<221> MISC\_FEATURE  
<222> (5)  
<223> Amino acid 5 is Xaa wherein Xaa = Nle.

<400> 88  
Cys Phe Gln Trp Xaa Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 89  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<220>  
<221> MISC\_FEATURE  
<222> (7)  
<223> Amino acid 7 is Xaa wherein Xaa = Orn.

<400> 89  
Cys Phe Gln Trp Gln Arg Xaa Met Arg Lys Val Arg  
1 5 10

<210> 90  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<220>  
<221> MISC\_FEATURE

<222> (7)  
<223> Amino acid 7 is Xaa wherein Xaa = Nle.

<400> 90  
Cys Phe Gln Trp Gln Arg Xaa Met Arg Lys Val Arg  
1 5 10

<210> 91  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein one aa has been substituted

<400> 91  
Cys Phe Gln Trp Lys Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 92  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresp. to a modification of  
the sequence consisting of aa 20-31 in human  
lactoferrin

<220>  
<221> MOD\_RES  
<222> (1)  
<223> ACETYLATION

<220>  
<221> MOD\_RES  
<222> (12)  
<223> AMIDATION

<400> 92  
Cys Phe Gln Trp Lys Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 93  
<211> 12  
<212> PRT  
<213> Artificial Sequence



&lt;220&gt;

<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein some aa have been substituted

&lt;400&gt; 93

Cys Phe Gln Trp Lys Arg Ala Met Arg Lys Val Arg  
1 5 10

&lt;210&gt; 94

&lt;211&gt; 12

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein some aa have been substituted

&lt;400&gt; 94

Cys Phe Ala Trp Lys Arg Asn Met Arg Lys Val Arg  
1 5 10

&lt;210&gt; 95

&lt;211&gt; 12

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein some aa have been substituted

&lt;400&gt; 95

Cys Phe Ala Trp Gln Arg Ala Met Arg Lys Val Arg  
1 5 10

&lt;210&gt; 96

&lt;211&gt; 12

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: of natural or  
artificial origin, corresponding to the sequence  
consisting of aa 20-31 in human lactoferrin  
wherein some aa have been substituted

&lt;400&gt; 96

Cys Phe Gln Leu Lys Lys Asn Met Lys Lys Val Arg  
1 5 10

<210> 97  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresp. to a modification of  
the sequence consisting of aa 18-31 in human  
lactoferrin

<400> 97  
Cys Phe Ala Leu Lys Lys Ala Met Lys Lys Val Arg  
1 5 10

<210> 98  
<211> 14  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresp. to a modification of  
the sequence consisting of aa 18-31 in human  
lactoferrin

<220>  
<221> MOD\_RES  
<222> (1)  
<223> ACETYLATION

<220>  
<221> MOD\_RES  
<222> (14)  
<223> AMIDATION

<400> 98  
Thr Lys Lys Phe Gln Trp Gln Arg Asn Met Arg Lys Val Arg  
1 5 10

<210> 99  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: of natural or  
artificial origin, corresp. to a modification of  
the sequence consisting of aa 20-31 in human  
lactoferrin

<220>  
<221> PEPTIDE

<222> (3)  
 <223> Amino acid 3 is Xaa wherein Xaa = Gln or Ala.  
  
 <220>  
 <221> PEPTIDE  
 <222> (4)  
 <223> Amino acid 4 is Xaa wherein Xaa = Trp or Leu.  
  
 <220>  
 <221> PEPTIDE  
 <222> (5)  
 <223> Amino acid 5 is Xaa wherein Xaa = Gln, Lys, Orn, Ala or Nle.  
  
 <220>  
 <221> PEPTIDE  
 <222> (6)  
 <223> Amino acid 6 is Xaa wherein Xaa = Arg, Lys or Ala.  
  
 <220>  
 <221> PEPTIDE  
 <222> (7)  
 <223> Amino acid 7 is Xaa wherein Xaa = Asn, Orn, Ala or Nle.  
  
 <220>  
 <221> PEPTIDE  
 <222> (8)  
 <223> Amino acid 8 is Xaa wherein Xaa = Met or Leu.  
  
 <220>  
 <221> PEPTIDE  
 <222> (9)  
 <223> Amino acid 9 is Xaa wherein Xaa = Arg or Lys.

<400> 99  
 Cys Phe Xaa Xaa Xaa Xaa Xaa Xaa Xaa Lys Val Arg  
 1 5 10

<210> 100  
 <211> 29  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: a fragment of  
 human lactoferrin consisting of the amino acids in  
 positions 12-40

<400> 100  
 Val Ser Gln Pro Glu Ala Thr Lys Cys Phe Gln Trp Gln Arg Asn Met  
 1 5 10 15

Arg Lys Val Arg Gly Pro Pro Val Ser Cys Ile Lys Arg  
 20 25

<210> 101  
 <211> 9  
 <212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: of natural or artificial origin, corresponding to modification of the sequence consisting of amino acids 16-40 in human lactoferrin of SEQ ID NO. 2

<400> 101

Gly Pro Pro Val Ser Cys Ile Lys Arg  
1 5

<210> 102

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: of natural or artificial origin, not a modification of the sequence consisting of amino acids 18-31 in human lactoferrin of SEQ ID NO. 99

<400> 102

Glu Ala Thr Lys  
1